



USACE: BALTIMORE DISTRICT

**National
Planning
Center of
Expertise for
Coastal
Storm Damage
Reduction**



US Army Corps
of Engineers
North Atlantic Division

Planning to save lives in the future.

**National Hurricane Program
Office**

Program Study Leader: Michael

- What is the NHP
- PCX Introduction to the NHP
- PCX Mission and Goals
- Program Organization
- What is a Hurricane Evacuation Study
- HURREVAC
- Storm Surge GIS Mapping Tool Demo
- Questions?

Discussion Topics



- Established 1985
- Mission: Support projects and activities to protect communities
- Partners: FEMA, NOAA, NWS, USDOT, USACE and others
- Special FEMA/USACE relationship to:
 - conduct Hurricane Evacuation Studies (HES)
 - develop and manage software tools (e.g., HURREVAC & ETIS) used by local emergency management agencies



National Hurricane Program

- Radically change the NHP by:
 - Established National Program Office
 - Automating HES process
 - Ensuring HES consistency
 - Comprehensive Training Program

“ACHIEVE THROUGH PCX”



**FEMA/USACE Vision for
NHP**

MISSION STATEMENT:

“To help protect communities and residents from hurricane hazards by conducting assessments, providing tools, and technical assistance to State and local agencies in developing hurricane evacuation plans.”

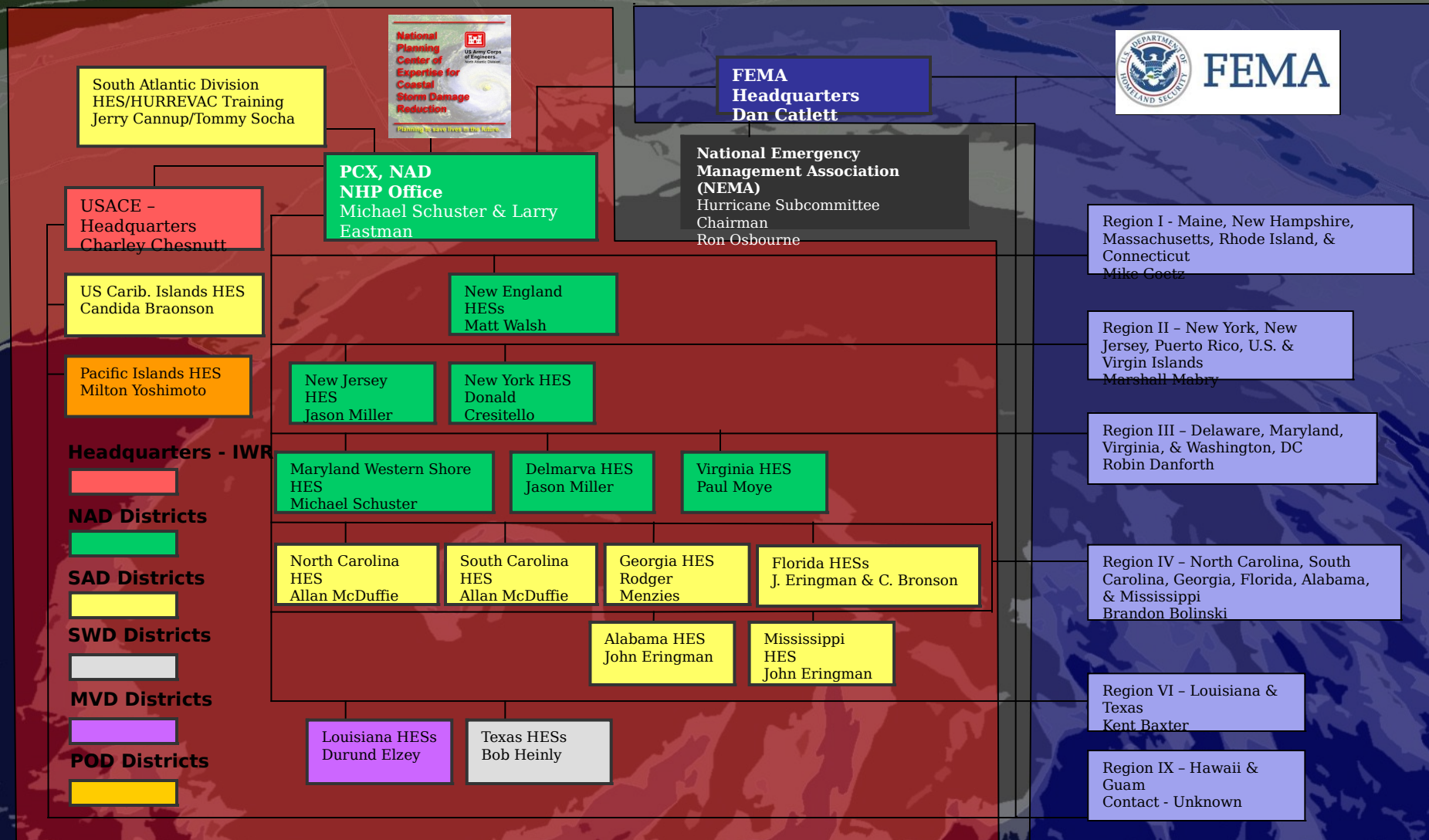


PCX/NHP Office Mission

- GOAL 1:** Maintain and Evolve the USACE NHP
- GOAL 2:** Oversight and Automation of Hurricane Evacuation Studies (HESs)
- GOAL 3:** Manage and Modernize Software Products (i.e., HURREVAC and ETIS)
- GOAL 4:** Create a HES Training Plan for Federal, State, and local emergency managers (through SAD)
- GOAL 5:** Maintain and Improve **COORDINATION** between FEMA and USACE



PCX/NHP Office Goals

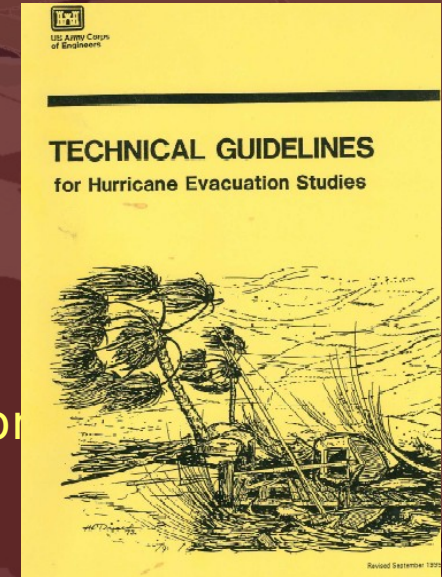


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PCX/NHP Office Organization

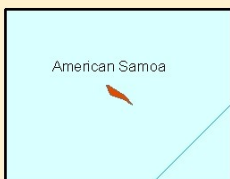
FIVE MAJOR STEPS:

- Hazards Analysis
 - Storm Surge GIS Data
- Behavioral Analysis
 - Survey of Human Behavior regarding Evacuation
- Vulnerability Analysis
 - Creation of Evacuation Zones
 - Determine Vulnerable Population and Points of Interest
- Shelter Analysis
 - Vulnerable Population vs. Shelter Capacity
- Traffic Analysis
 - Clearance Times

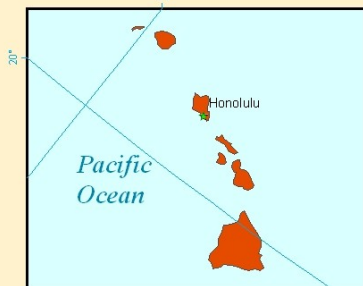


HES Process

U.S. Territories



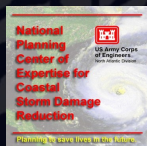
Hawaii



- Legend**
- Lakes
 - State Boundaries
 - Coastal_County
 - HES Status**
 - Complete
 - On-Going/Re-Study
 - Still Researching

Hurricane Evacuation Study - Status Map

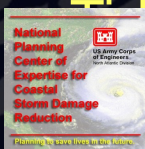
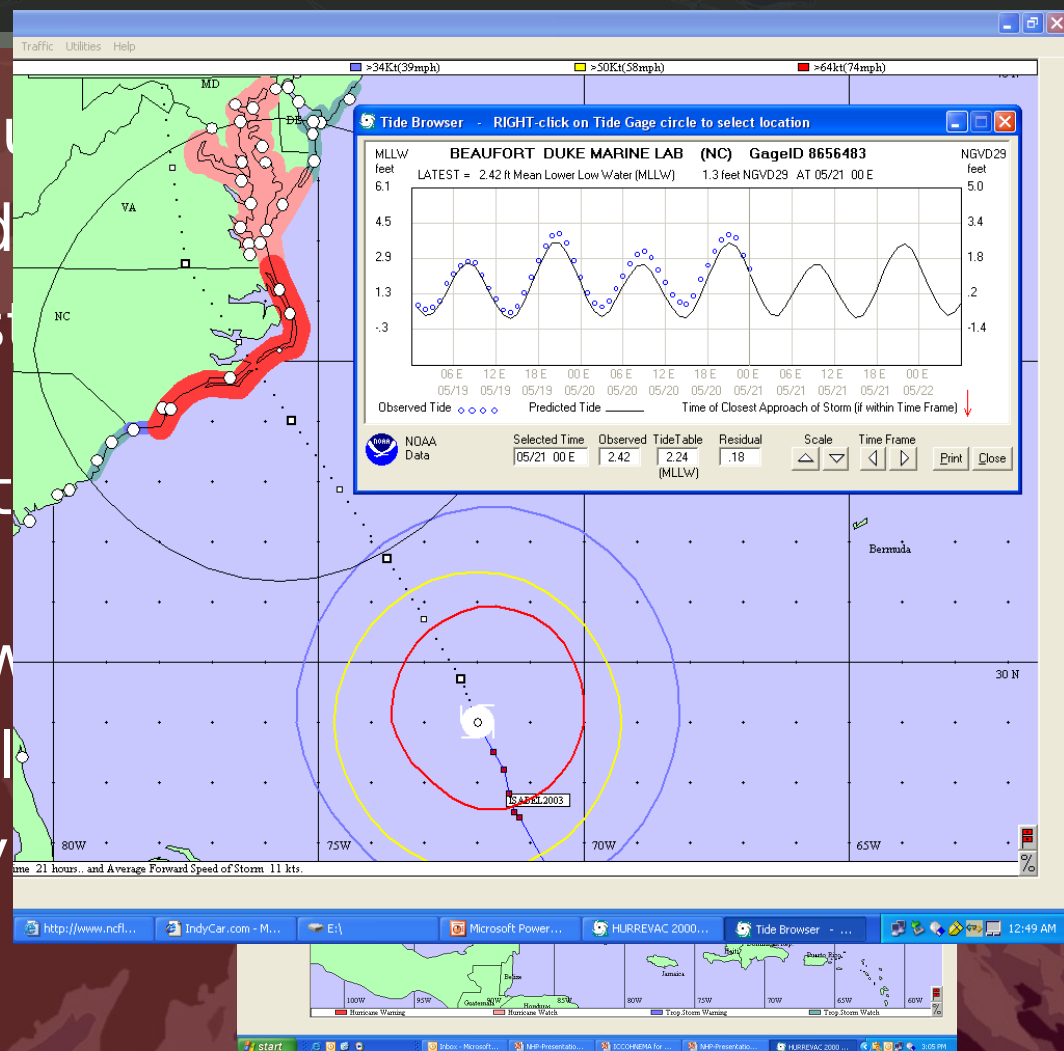
Albers Projection
Central Meridian: -96
1st Std Parallel: 20
2nd Std Parallel: 00
Latitude of Origin: 40



HES Status Map

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- Restricted-use computer
- Funded by FEMA and
- Atlantic and Pacific s
- capability
- Used by government managers
- 18,000 users world-w
- Decision making tool
- Real-time data analy
- Storm Tracking
- Wind Speed
- Path Forecasting
- Transportation Clearance Times
- Tidal & River Gauges



HURREVAC

Vision of the Future

- Seamless Coordination with FEMA
- Replace the current HES process with a Comprehensive Hurricane Evacuation Management Strategy (CHEMS)
- Improve Corps District's Capabilities to support the PCX and produce NHP products

Challenges

- Coordination with FEMA HQ, FEMA Regions, and Districts
 - Multiple Stakeholders
- Increase Corps funding contribution to the NHP
 - Only 15% of the NHP funding comes from the Corps



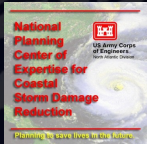
PCX/NHP Future and Challenges

- GIS DATA
 - SLOSH (NHC/NOAA)
 - Elevation Data (LIDAR & USGS)
- Analysis = Difference between the height of flooding and the elevation of the land

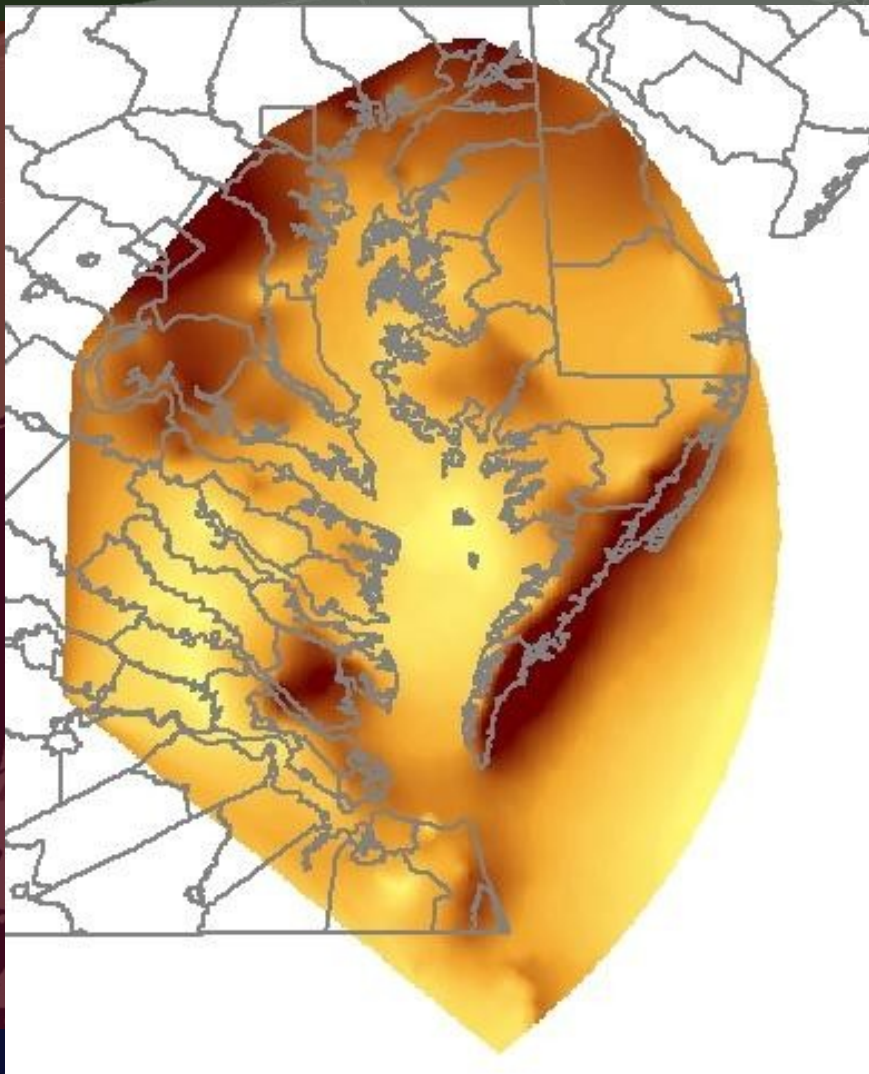


HES Storm Surge GIS Mapping

- **SLOSH** = Sea, Lake and Overland Surges from Hurricanes
- Computerized model created by the National Hurricane Center (NHC)/NOAA
- Estimates storm surge heights from potential hurricanes



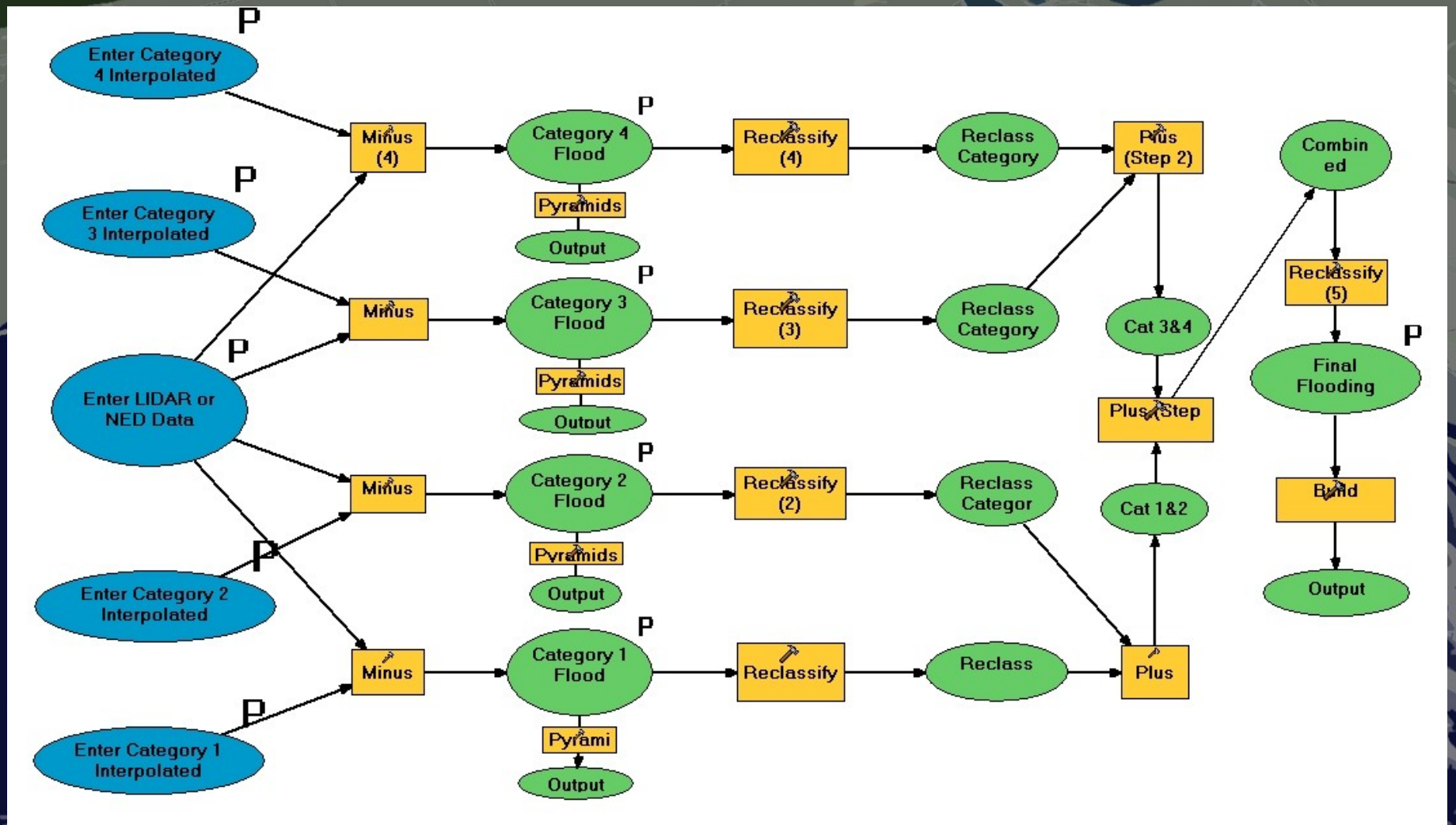
What is SLOSH?



- Raw SLOSH data, showing Category 4 flooding in polygon shapefile format
- Converted to point data using centroids of shapes
- Interpolated point values to grid for use in HES model.
- Values converted from NGVD 29 Feet to values in NAVD 88 Meters to match LIDAR and DEM data



SLOSH Interpolation



ArcGIS ModelBuilder



- Raw model output as raster
- Smoothing model created to transfer flooding from raster data into easy to use polygon format



ArcGIS ModelBuilder Process

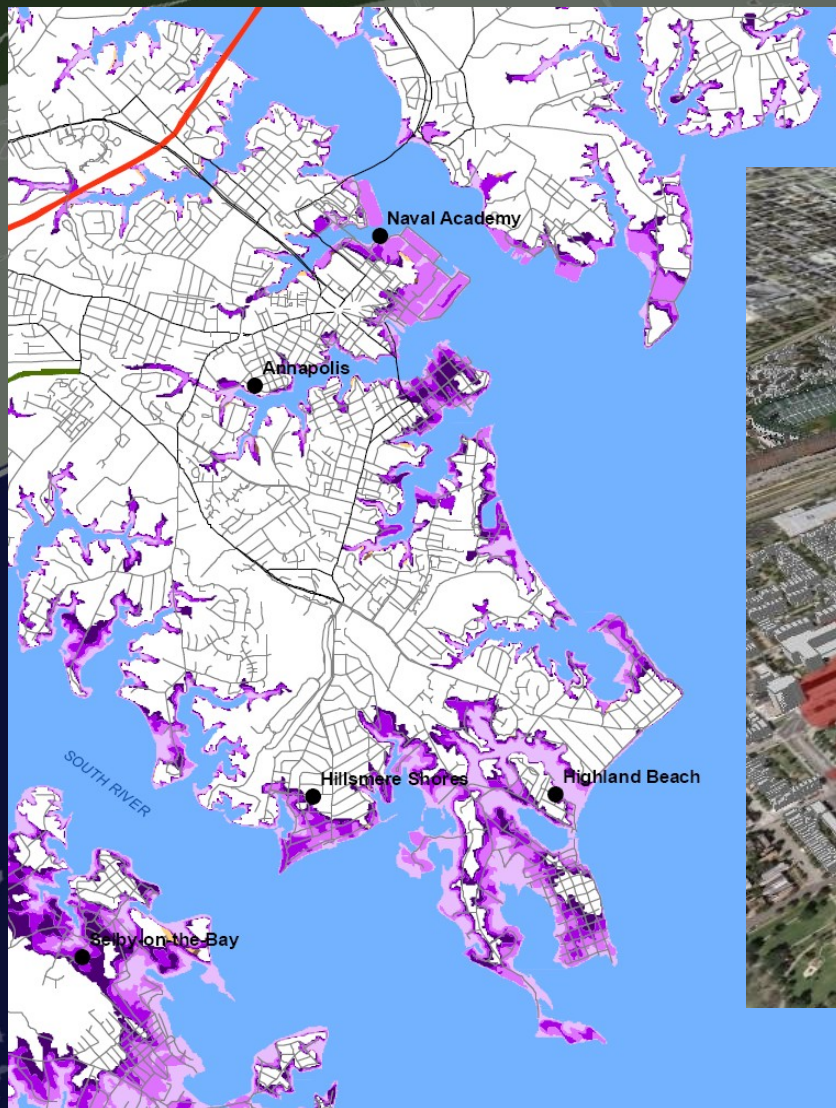


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Final Storm Surge Mapping

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QUESTIONS?

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